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## THE CHALLENGES OF MASSIVE OPEN ONLINE COURSES (MOOC) – A PRELIMINARY REVIEW

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**ABSTRACT.** Massive Open Online Course (MOOC) is one of the most recent innovations in education. It is a form of an open source learning system that offers free and short online courses to anyone who has access to the Internet. MOOC offers a lifelong learning opportunity and a number of existing MOOC online platforms include edX, Coursera, Udacity, and Udemy. However, there are a number of problems and challenges in MOOC, among the major recurring issue is the consistently high dropout rate of MOOC learners. In this paper, we introduce a critical review of literature relating to MOOC dropout rates, bringing together existing findings on completion rates and analyses of several specific courses related to these organizations, which identify factors that correlate to the likelihood of dropout. Finally, we discuss our findings relating MOOC dropout rates, considering what factors are within the control of an MOOC provider and suggesting the most promising avenues for improvement.

**Keywords:** Massive open online courses, MOOCs Platforms, completion rate.

### INTRODUCTION

Massive Online Open Course (MOOC) represents a recent trend in online education, which many universities offering quality courses through online platforms. MOOCs offer students an opportunity to learn from the best educators in some of the world's top universities with minimal cost (Gaebel, 2014). The rapid growth in technology makes MOOCs able to reach thousands of participants or MOOC learner from all over the world (Baggaley, 2014). MOOC platforms allow individuals who are interested to develop or teach some courses to make full use of the MOOC platforms, which are supported by cloud computing technology and integrated with other resources. However, it is important to identify the student preferences and intentions, and take these into considerations at an early phase before further implementation of new MOOC courses.

The high number of students and courses provided by the universities in the traditional educational setting cause some logistics issues, such as space and time. Thus, there exist the needs of unlimited participations and open access to course materials in the contemporary education process (Gerber, 2014). The earlier major forms of communication between a student and a remote location were television, video cassettes, or audio tape cassettes (Knox, 2014). Nowadays, due to the advancement in the internet-related technology and tools instruments provides universities the opportunity to precast their class through the internet. This ability, integrated with the internet instruments help to meet the increasing demand for higher education, particularly in providing online open courses for tertiary education. This idea has generated large number of online courses in the education field and known as Massive Open Online Courses (MOOCs) (Billings & Halstead, 2015). The first open e-learning course was

launched in 2008 , when about 2,300 students from the general public took part in an open online course free of charge that over 12 weeks called “Connectivism and Connective

Knowledge”, organized by Stephen Downes and George Siemens in University of Manitoba (Canada) (Sanchez-Gordon & Luján-Mora, 2013) Then MOOC concept became widespread in 2012 when several large universities started their own MOOCs. According to The New York Times, 2012 is "the year of the MOOC" (Johnson & Becker, 2014). By the end of the first half of 2014, The University of Pennsylvania has reported, 2.3 million students from more than 200 countries have enrolled for open courses.

## CURRENT MOOC PROVIDERS

One of the main MOOC providers is edX, which is founded by Massachusetts Institute of Technology and Harvard University, whereby the MOOCs related resources are contributed by these two institutions. Currently, there is a total of 20 to 30 MOOCs offered by edX. An- other prominent MOOC provider is Coursera, which is a collaboration between few venture capitalists, New Enterprise Associates and Kleiner, Perkins, Caufield & Byers Education with four (4) university partners, namely Stanford University, Princeton University and the Universities of Michigan and Pennsylvania (Belleflamme & Jacqmin, 2016). Coursera currently has 197 courses in 18 subjects, including computer science, mathematics, business, humanities, social science, medicine, engineering and education. Another MOOC provider, UDACITY, is a start-up company funded by Sebastian Thrun, David Stavens and Mike Sokolsky. Currently, UDACITY offers 18 online courses in computer science, mathematics, general sciences, programming and entrepreneurship. Udemy, another MOOC provider was founded by Insight Venture Partners, currently offers over 5,000 courses. P2Pu was launched in 2009 with funding from the Hewlett Foundation and the Shuttleworth Foundation and currently offers over 50 courses. P2Pu is trying to improve the quality of the courses it offered relying on community-review, feedback and revision (Yuan and Powell 2013). Several similarities and variations are noted between these MOOC models of these providers and related to the models interaction to the participants, and, the content of these models (Zare, Pahl, Nilashi, Salim, & Ibrahim, 2015). The following table investigates of such features.

**Table 1: MOOC Features**

MOOC Platforms Features	eDX	Coursera	Udacity	Udemy	P2Pu
Certification	Partial	Provided	Provided	Partial	No
Feedback	Partial	Non	Partial	Provided	Provided
Profit	Non	Profit	Profit	Profit	Non
Institution Credit	Non	Partial	Partial	Partial	Non
Hosting	Self	Hosted	3 <sup>rd</sup> party	Hosted	Self –3 <sup>rd</sup> party
Max class Size	Limited	Unlimited	Unlimited	Unlimited	Unlimited

As shown in Table 1, the first feature being compared is certification, which assess as whether a particular MOOC learner has achieved a targeted level of a certain course. The certification is offered at no additional cost Coursera and Udacity, but for edX, online participant who demonstrate mastery of subjects can pay a modest fee for a certificate of completion. Differently, the P2Pu provide no certifications to the participants. The feedback feature is related on the response that a student gets from the MOOC provider on their inquiry. In edX, feedback is only provided if the participant submits their assignments as a grade. Udacity has partial feedback, which means that it provides full feedback to the participants who have paid registration fees and after the course is completed. Udemy and P2Pu provide full feedback to the participants on their queries. In contrary, Coursera do not provide any feedbacks. Commercial marketing of these models varies to profit or non-profit models. Most of these platforms are non-profit. edX and P2Pu are commercial models which requires partici-

pants to pay registration fee. Institution credit is provided to the participant after he/she finishes the courses at the institution. The credit indicates that the participants have attended the required course. edX and P2Pu do not provide any institution credit to the participants. The hosting feature shows if it is stand alone on the platform site or hosted by other sites. The class size, although all MOOCs are known to have unlimited number of participants, edX has limitation to 30000 participants.

## **CHALLENGES OF MOOCs:**

MOOCs offer a great opportunity for any Internet user to discover a new area of interest or take higher education. MOOCs grants the flexibility that many students need for knowledge acquisition (Gordon 2014). MOOCs motivate students to interact with other students who have the same interest. Being part of a universal class, participants can gain insight into attitude, thoughts, and trends among different people and nationality on a certain topic. Beside these benefits, several challenges facing the institutions to apply MOOC efficiently. This issue related to participant and the courses which discussed as the following:

### **Very Low Completion Rates**

This is the strongest argument against MOOCs, as there is supporting evidence to prove this. Research has shown that MOOCs completion rates can be as low as 7% (Parr 2012), as learners' participation seems to start dropping even from the very first week of attendance. Many attribute these low completion rates to lack of interaction (Kopp & Lackner, 2014) or to the fact that completion is not important, as learners usually enter to look for a specific piece of information they need (Matthew 2015). The fact that MOOCs are given for free, may attract learners who want to give them a try, but does not necessarily imply that these people were initially interested in the subject matter or committed to complete the MOOC course. As a matter of fact, there are other studies mentioning that learners who were asked to pay a small fee had shown higher completion rates (Tim, 2015). Therefore, it's safe to conclude that low completion rates have nothing to do with the quality of MOOC courses, nor with the degree of satisfaction online learners may experience.

### **Low Motivation**

It is generally true that self-study requires commitment and self-discipline. In most cases, especially for asynchronous MOOC courses, learners may not be motivated enough to keep up with their online content. In synchronous eLearning, however, this is part of the duties of the facilitator of the MOOC course.

### **Low Perceived Value Compared To University Degrees**

Another major reason why MOOCs are not so widely spread yet is because they are considered to be "competitive" to university attendance. MOOCs give everyone the opportunity to access academic material and even acquire an online degree, which raises a series of questions, such as the future of instructor-led classroom, physical or virtual; the real value of university degrees earned online compared those earned at a college or university campus. Again, seeing MOOCs under the concept of lifelong learning and advertising them as such may be the answer to this issue.

## **COMPLETION AMONG MOOC PROVIDERS AND SMALLER ACADEMIC INSTITUTIONS**

The decision to offer MOOC programs or not, also affects the way actual universities and colleges operate. Are MOOCs the new face of academic institutions for the 21st century they cannot do without? How the private sector does enters the game? Are small colleges willing

to buy MOOC material from other universities, or even, private companies, or they will try to build their own MOOC material? Can they afford to do so? Isn't this a typical example of unequal opportunities? From an instructor's and organizational point of view, it requires extensive time, money, effort and devotion to build a new MOOC course, and smaller colleges certainly neither do they possess the resources to develop them, nor the worldwide reputation to "market" them accordingly in order to promote their work (Onah, Sinclair, & Boyatt, 2014).

Completion rates are relatively low even among students who intend to complete the course an average of 22% (Reich, 2014) so for those students who intend to complete courses or engage with the course as designed, not considering completion rates prevents exploration of what can be done by educators to facilitate further student success. Several literatures had done to study the completion rate among MOOCs platforms. For that, we introduce a critical review of literature relating to MOOC dropout rates, bringing together existing findings on completion rates and analyses of several specific courses related to these organizations, which identify factors that correlate to the likelihood of dropout (Jordan, 2015).

## **MOOCs AT INSTITUTIONAL HIGHER LEARNING AND THE COMPLETION RATE ISSUE**

The phenomenon of a profound and pervasive interest in the MOOC initiative is regarded as „the educational buzzword of 2012“ by Daniel (2012). According to the New York Times, 2012 is „the Year of the MOOC“ (Pappano, 2012). In spite of this growing popularity, Markoff (2013) shows that only a very small number of all those thousands who enroll for MOOCs really complete the MOOCs.

In 2011, the first American MOOC was conceptualised, introduced by Sebastian Thrun and Peter Norvig of Stanford University. A total of 160,000 students across 190 countries enrolled for the Artificial Intelligence course. There was an additional 200 registrations for the course on campus. Within a few weeks into the semester, it was observed that the attendance at the Stanford dropped to about 30, since most preferred the online videos to seeing their professors in person. The low rate of completion is mostly attributed to the users' objectives and goals, since the MOOC users have very diverse backgrounds, experiences and motivations to take up the courses, unlike the participants of conventional education who share a level of uniformity in their motivations and experiences. This makes the evaluation of MOOCs' efficacy extremely difficult and time consuming as it is not feasible to assess all the participants and their objectives.

As reported by Meyer (2012), the rate of dropouts from MOOCs in Stanford, MIT and UC Berkley stands at 80-95%. For example, out of the 50,000 students who enrolled for the Coursera-UC Berkeley course in Software Engineering, only 7% completed the course. A similar dropout rate is observed in the Coursera's Social Network Analysis course, where only 2% users completed the course to earn a basic certificate, while only 0.17% earned the higher level programming with a distinction certificate. The significance of these rates depends greatly on the perceived objective of the MOOCs in the first place. If the objective is to provide everyone with the opportunity to access free and high-quality courses from elite universities and by renowned professors, then the high rates of dropout may be an inconsequential matter (Gee, 2012). But it has been widely agreed that improving the retention rates of MOOCs by determining why and at what stage the participants drop out of the courses will be highly beneficial.

Bruff (2013) cited MOOC, launched on 4 March 2013, and titled Pattern-Oriented Software Architectures for Concurrent and Networked Software (POSA) by Doug Schmidt. The course duration was ten weeks and had around 31,000 enrolled students, who did activities

other than enrolment, such as taking a quiz, watching a video, and visiting the discussion platform. Of the 23,313 active students, 20,933 (90%) watched at least one lecture video, 5,702 (24%) partook in at least one quiz, 2,072 (9%) made a submission of at least one assignment for peer grading, and 942 (4%) made at least one posting on the discussion platforms. From the 23,313 active students, 1,051 (4.5%) attained a standard statement of accomplishment and 592 (2.5%) attained a statement of accomplishment “with distinction”. Thus, 1,643 (7%) students attained a certain form of statement. The completion rate was low as MOOC students do not pay tuition and do not earn credit; so the drive for completing a course is mostly inherent. The statements of accomplishment may carry value for few students, but they did not match up to course credit.

Katty Jordan (2015) created a visualisation site which studied MOOC issues. The data visualisation pools together information regarding enrolment numbers and rates of completion from across online news articles and blog posts. Many studies were conducted by Jordan to determine issues pertaining to student enrolment and rate of completion. In 2013, Jordan sought to synthesise data of MOOC rate of completion – from xMOOCs especially and majorly from Coursera. The average completion rate for xMOOCs was 7.6%, with 0.67% being the minimum and 19.2% being the maximum. The 19.2% seems to be an outlier “Functional Programming Principles in Scala” from Switzerland's École Polytechnique Fédérale de Lausanne, provided on the MOOC platform, Coursera. The lowest completion rate was “A History of the World since 1300” from Princeton University, also provided on Coursera.

In 2015, a study by (Aboshady et al. 2015) was conducted to evaluate the incidence of awareness and usage of MOOCs among medical undergraduates in Egypt as an emerging nation. The study covered undergraduate medical students throughout Egypt, enrolled in 19 medical schools in the 2013–2014 academic periods. Students in these schools were admitted for a Bachelor of Medicine and Bachelor of Surgery (MBBCh) programme. A total of 1784 pupils were needed to represent the study populace. A stratified simple random technique was deployed to choose the sample with an equal apportionment of partakers in every university and study year. Based on the name lists of registered students, 270 students from each faculty (45 for every study year) were chosen randomly for a total of 2700 partakers; 136 students had actually enrolled for MOOCs. An online survey program to hand out the questionnaire (Survey Gizmo; Boulder, Colorado, USA) was deployed. Statistical analysis was carried out by employing the IBM SPSS statistical software package V.22. The results of the statistical relations indicated two limitations pertaining to the 136 students who enrolled for MOOCs. Most students (105; 77.2%) did not have enough time to complete the course. Furthermore, a slow Internet speed was another hindrance for several students (73; 53.7%).

## DISCUSSION

Understanding the factors which affect completion rate can be approached from the perspective of characteristics of learners and their reasons for participating, or improving the design of courses. Several studies reviewed and analysis in order to indicate the issues that impact the completion rate of the participants. In the literature on MOOCs there is a lack of peer-reviewed research publications which draw upon more than a small number of courses restricted to single institutions, and the need for meta-analysis independent of MOOC platform providers is a key issue for the field at present. Time and the participant's motivation are the most cited issues caused the high drop rate. Our critical review has highlighted many issues pertaining to the rate of completion, which have been further deliberated by the authors. Coursera and edX are contemplating charging a reasonable fee for issuing non-credit certificates. According to Coursera, it could function as a head-hunter, providing names of its top performing pupils to prospective employers, much on the lines of Udacity: The accreditation issue too is not impossible to tackle. Furthermore, few of the MOOCs students have managed



to receive transfer credits for the courses by means of another university. This included PhD students who made arrangements to have assignments graded by tutors at the university where they were enrolled. The lack of accreditation is also a major concern. Furthermore, the technology deployed to deliver MOOCs is not fully developed and as user friendly as it ideally should be. Of course, this situation could change sooner, as edX has vowed to make its platform available free for all. Notably, complicated math subjects like mathematics and physics are quite tough to understand in the absence of assessments. All prior studies have highlighted the inadequate feedback to students' queries during the lectures, and the need for evaluation, given the high volume of low completion rates of the enrolled students for MOOCs.

## CONCLUSION

Massive Open Online Courses (MOOCs) have the potential to enable institutions of high learning on an enormous scale. Many MOOCs initiatives continue to report high completion rates among participants. This paper presents a study of the MOOCs platforms and its use to improve the educational process and the challenges of participants to drop out from the courses. Several studies reviewed to conclude crucial factors for the high dropout rate in MOOCs: lack of time, lack of learners' motivation, feelings of isolation and the lack of interactivity in MOOCs, insufficient background and skills and hidden costs. Consequently, some techniques should be used to increase the online completion rate, and allow more online participants to graduate. For example accommodating students to different timetables, promoting student completion or enhancing "student to students" and "student to instructor" interaction as well as increasing online learning skills. Finally it must be pointed out that this research work is a first contribution to identify the most cited problems of the completion rate. It's worthy to note drop rate problem studied less and the solution to such issue needs more investigations.

## REFERENCES

- Belleflamme, P., & Jacqmin, J. (2016). An Economic Appraisal Of MOOC Platforms: Business Models And Impacts On Higher Education. *CESifo Economic Studies*, 62(1), 148–169. <http://doi.org/10.1093/cesifo/ifv016>
- Baggaley, J. (2014). MOOC Postscript. *Distance Education*, 35(1), 126–132. <http://doi.org/10.1080/01587919.2013.876142>
- Billings, D. M., & Halstead, J. A. (2015). Teaching in Nursing: A Guide for Faculty. *Elsevier - Health Sciences Division*. P 357. Retrieved from <https://books.google.com.my/books?id=YxzmCgAAQBAJ>
- Bruff, D. (2013). Lessons Learned from Vanderbilt's First MOOCs. Retrieved from <https://cft.vanderbilt.edu/2013/08/lessons-learned-from-vanderbilts-first-moocs/>.
- Chea, Chiam Chooi. (2010). *Benefits and Challenges of Massive Open Online Courses*. *Cancer* 8(911724993): 16–23.
- Gaebel, M. (2014). Moocs - Massive Open Online Courses. *European University Association Occasional Papers*, (Update of EUA's first paper (January 2013)). [http://doi.org/10.1016/S0022-3913\(12\)00047-9](http://doi.org/10.1016/S0022-3913(12)00047-9).
- Gerber, J. (2014). Los Angeles Moocs : Innovation, Disruption and Instructional Leadership In Higher Education. *Journal of Educational Technology & Society*, 15.4, 380–389.
- Knox, J. (2014). Digital Culture Clash: "Massive" Education In The E-Learning And Digital Cultures MOOC. *Distance Education*, 35(2), 164–177. <http://doi.org/10.1080/01587919.2014.917704>
- Onah, D.F.O, J Sinclair, and Boyatt. (2014). Dropout Rates Of Massive Open Online Courses : Behavioural Patterns Mooc Dropout and Completion : Existing Evaluations. *Proceedings of the 6th International Conference on Education and New Learning Technologies (EDULEARN14)*: 1–10.
- Parr, C. (2012). Mooc Completion Rates "Below 7%". Open Online Courses" Cohort Much Less Massive At Finish Line. *JLIS*. It, 5.1, p.241.
- Yuan, L and Powell, S. (2013). MOOCs and Open Education : Implications for Higher Education, A

White Paper.

- Zare, M., Pahl, C., Nilashi, M., Salim, N., & Ibrahim, O. (2015). A Review Of Semantic Similarity Measures In Biomedical Domain Using SNOMED-CT. *Journal of Soft Computing and Decision Support Systems*, 2(6), 1–13. Retrieved from <http://jscdss.com/index.php/files/article/view/61>.
- Sanchez-Gordon, S., & Luján-Mora, S. (2013). Web accessibility of MOOCs for elderly students. *2013 12th International Conference on Information Technology Based Higher Education and Training, ITHET 2013*. <http://doi.org/10.1109/ITHET.2013.6671024>
- Johnson, L., & Becker, S. A. (2014). Enter the Anti-MOOCs: The Reinvention of Online Learning as a Form of Social Commentary. *Internet Learning Journal*, 3(2), 6–20. Retrieved from <http://digitalcommons.apus.edu/internetlearning%5Cnhttp://digitalcommons.apus.edu/internetlearning/vol3/iss2/2%5Cnhttp://search.ebscohost.com/login.aspx?direct=true&db=eue&AN=101788065&site=ehost-live>
- Gordon, N. (2014). Flexible Pedagogies: technology-enhanced learning. *Flexible Pedagogies: Preparing for the Future*, (January), 25. <http://doi.org/10.13140/2.1.2052.5760>
- Kopp, M., & Lackner, E. (2014). *Do MOOCs Need a Special Instructional Design?* *EDULEARN14 Proceedings*, (July), Page, 7138- 7147.
- Matthew, L. (2015). MOOCs --Completion Is Not Important. *Forbes*.
- Tim, D. (2015). Fee payments lift MOOC completion rates. Retrieved from <http://www.afr.com/news/policy/education/fee-payments-lift-mooc-completion-rates-20150412-1mhw76>
- Jordan, K. (2015). Massive Open Online Course Completion Rates Revisited : Assessment , Length and Attrition. *International Review of Research in Open and Distributed Learning*, 16(3), 341–358. <http://doi.org/10.13140/RG.2.1.2119.6963>
- Meyer, R. (2012). What It's Like to Teach a MOOC (and What the Heck's a MOOC?). Retrieved from [http://www.theatlantic.com/technology/archive/2012/07/what-its-like-to-teach-a-mooc-\\_\\_\\_\\_and-what-the-hecks-a-mooc/260000/](http://www.theatlantic.com/technology/archive/2012/07/what-its-like-to-teach-a-mooc-____and-what-the-hecks-a-mooc/260000/)
- Gee, S. (2012). MITx - the Fallout Rate. Retrieved from <http://www.i-programmer.info/news/150-training-a-education/4372-mitx-the-fallout-rate.html>